

PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q81022

Masahiko HIROSE, et al.

Appln. No.: 10/826,301

Group Art Unit: 1723

Confirmation No.: 9820

Examiner: Krishnan S. MENON

Filed: April 19, 2004

For: COMPOSITE SEMIPERMEABLE MEMBRANE AND PROCESS FOR PRODUCING THE SAME

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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U.S. Application No. 10/826,301

Attorney Docket Q81022

I. REAL PARTY IN INTEREST

The real party in interest is Nitto Denko Corporation.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the Assignee of this application are not aware of any other appeals or interferences that will directly affect, or be affected by, or have a bearing on the Board's decision in the pending appeal.

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III. STATUS OF CLAIMS

Claims 1-7 are pending in the application.

This is an appeal from the Examiner's rejection of claims 1-5 and 7 under 35 U.S.C. § 102(b) and the Examiner's rejection of claims 1-7 under 35 U.S.C. § 102(b).

IV. STATUS OF AMENDMENTS

The Amendment submitted on April 25, 2007 is the last response submitted with amendments to the claims of the application. The Amendment filed on April 25, 2007 was entered. There are no outstanding amendments to the claims or to the specification in the present application.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention provides a process for producing a composite semipermeable membrane which combines high ability to reject salts and a high permeation flux and is especially excellent in the ability to reject uncharged substances. *See* page 2, second full paragraph.

The process for producing a composite semipermeable membrane according to the present invention comprises forming on a surface of a porous supporting film a thin film comprising a polyamide resin obtained by reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid. *See* page 2, fourth full paragraph. The polyfunctional amine ingredient is aromatic or aliphatic. *See* page 4, fifth full paragraph.

In addition, the thin film is formed by bringing an aqueous solution prepared by mixing at least the polyfunctional amine ingredient, the alkali metal hydroxide, the organic acid and water, into contact with an organic solution containing the polyfunctional acid ingredient to cause interfacial polymerization. *See* page 3, second paragraph. Also, after the interfacial polymerization, the resulting film can be heated to 100°C or higher to thereby produce the thin film. *Id.* By the heating to 100°C or higher, the mechanical strength, heat resistance and other properties of the thin film can be improved. *Id.*

The organic acid used in the process preferably contains a sulfo group and/or a carboxyl group, and the organic acid preferably is an organic acid which does not have a long-chain alkyl group having 6 or more carbon atoms. *See* page 3, third paragraph.

It is preferred that the ratio of the normality of the alkali metal hydroxide to be mixed

with water to that of the organic acid to be mixed with the water (alkali metal hydroxide/organic acid) be from 1.2/1 to 0.9/1 and that the aqueous solution have a pH of 5-11. See paragraph bridging pages 3 and 4. Where the normality ratio exceeds 1.2/1, the aqueous solution has an increased pH and this tends to result in a reduced permeation flux. *Id.* On the other hand, where the normality ratio is lower than 0.9/1, the aqueous solution has a reduced pH to show reduced reactivity in interfacial polymerization and, hence, high salt-rejecting ability tends to be not obtained. *Id.*

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issue on appeal is whether the Examiner improperly finally rejected claims 1-5 and 7 under 35 U.S.C. § 102(b) as allegedly being anticipated by WO 99/01208 (US equivalent to Hirose (US 6,723,422)) and claims 1-7 under 35 U.S.C. § 102(b) as allegedly being anticipated by Tomaschke (US 6,464,873).

VII. ARGUMENT

A. Claims 1-5 and 7 are not anticipated by Hirose

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Thus, anticipation under §102 requires the identical invention to be shown in the prior art in as complete detail as is contained in the claim. For the reasons below, it is respectfully submitted that Hirose does not disclose the subject matter of claim 1 (or the claims depending therefrom) with the specificity necessary for anticipation under §102.

The process in claim 1 is directed to a process for producing a composite semipermeable membrane which comprises forming on a surface of a porous supporting film a thin film comprising a polyamide resin obtained by reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, wherein the polyfunctional amine ingredient is an aromatic or aliphatic polyfunctional amine ingredient (emphasis added).

Hirose discloses a method of producing a composite reverse osmosis membrane in which a layer is formed on a porous support by coating the support with a solution A (comprising one or more polyfunctional amines) (col. 2, lines 42-47). Then, this layer is contacted with solution B (comprising one or more polyfunctional acid halide compounds) and further contacted with solution C (comprising polyfunctional acid halide compounds) (col. 2, lines 48-54).

The Examiner takes the position that polyacrylic acid is an organic acid, and since Hirose adds NaOH, the reaction occurs in the presence of an organic acid and an alkali metal

hydroxide as claimed.

Appellants respectfully disagree.

Claim 1 recites "reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid" (underlining added). In contrast, Hirose discloses that a layer is formed on a porous support by coating the support with a solution A (comprising one or more polyfunctional amines), then this layer is contacted with solution B (comprising one or more polyfunctional acid halide compounds) and further contacted with solution C (comprising polyfunctional acid halide compounds) to form a polyamide skin layer on the porous support. During this process, there is no alkali metal hydroxide or organic acid present. In addition, Hirose discloses that after contact with solution C (i.e., after the polyamide skin layer is formed), the layer is contacted with at least either an acidic aqueous solution or an alkaline aqueous solution.

Therefore, Hirose does not disclose reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, as recited in claim 1.

In addition, each of claims 2-7 depend, directly or indirectly, from claim 1. Thus, it is respectfully submitted that these claims are not anticipated for at least the same reasons as claim 1.

II. Claims 1-7 are not anticipated by Tomaschke

Claims 1-7 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Tomaschke, U.S. Patent No. 6,464,873.

The Examiner asserts that Tomaschke discloses a process of producing a polyamide

membrane made by interfacial polymerization of a polyamine and a polyacid chloride in the presence of camphor sulfonic acid and sodium hydroxide on polysulfone porous membrane. *See* Example 1.

Appellants respectfully disagree.

In Example 1 in Tomaschke, a 4,4'-bipiperidine reactant, TEACSA and sodium lauryl sulfate are combined. TEACSA contains a salt of triethylamine and camphorsulfonic acid. The aqueous solution of 4,4'-bipiperidine reactant is coated on a substrate and the substrate is contacted with trimesoyl chloride. Since TEACSA is a salt of triethylamine and camphor sulfonic acid, it cannot be considered that the triethylamine part of TEACSA reacts with trimesoyl chloride.

Thus, Tomaschke does not disclose reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, as recited in claim 1.

In addition, bipiperidine is an essential component of Tomaschke's invention, whereas claim 1 recites that a polyfunctional amine ingredient is reacted with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, and that the polyfunctional amine ingredient is an aromatic or aliphatic polyfunctional amine ingredient.

Further, the Examiner asserts that Appellants' claimed normality ratio of organic acid to sodium hydroxide is inherently disclosed in Tomaschke since Tomaschke teaches the pH falls in the same range as claimed (see claim 7).

In Example 1 in Tomaschke, the pH of the 4,4'-bipiperidine reactant is adjusted to 12.75. This is outside the pH range recited in claim 7. Additionally, in column 8, lines 19-22,

Tomaschke discloses that the aqueous solution containing a biperidine reactant generally has a pH of about 10 to about 14, preferably about 11 to about 13. Therefore, the normality ratio of organic acid to sodium hydroxide in Tomaschke is also outside the range recited in claim 6.

For the above reasons, it is respectfully submitted that Tomaschke does not anticipate claim 1 or the claims depending therefrom.

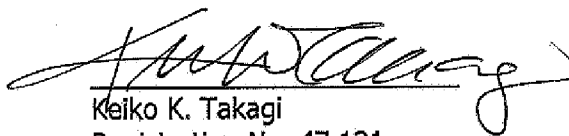
III. Conclusion

In view of the above, Appellants submit that the Examiner's rejections are improper and should be reversed.

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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65565

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Date: July 25, 2007

CLAIMS APPENDIX

CLAIMS 1-7 ON APPEAL:

1. (previously presented): A process for producing a composite semipermeable membrane which comprises forming on a surface of a porous supporting film a thin film comprising a polyamide resin obtained by reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, wherein the polyfunctional amine ingredient is aromatic or aliphatic.
2. (original): The process as claimed in claim 1, wherein the thin film is formed by bringing an aqueous solution prepared by mixing at least the polyfunctional amine ingredient, the alkali metal hydroxide, the organic acid, and water into contact with an organic solution containing the polyfunctional acid ingredient to cause interfacial polymerization.
3. (original): The process as claimed in claim 2, wherein the thin film is heated to 100°C or higher.
4. (original): The process as claimed in claim 1, wherein the organic acid contains at least one of a sulfo group and a carboxyl group.
5. (original): The process as claimed in claim 1, wherein the organic acid is an organic acid which does not have a long-chain alkyl group having 6 or more carbon atoms.
6. (original): The process as claimed in claim 2, wherein the ratio of the normality of the alkali metal hydroxide to that of the organic acid to be mixed therewith (alkali metal hydroxide/organic acid) is from 1.2/1 to 0.9/1.
7. (original): The process as claimed in claim 2, wherein the aqueous solution has a pH

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of 5-11.

8-16. (canceled).

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SUBMISSION OF APPEAL BRIEF

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P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. A check for the statutory fee of \$500.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,



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